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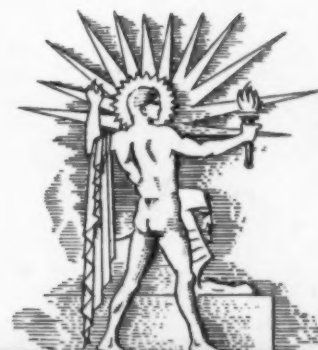
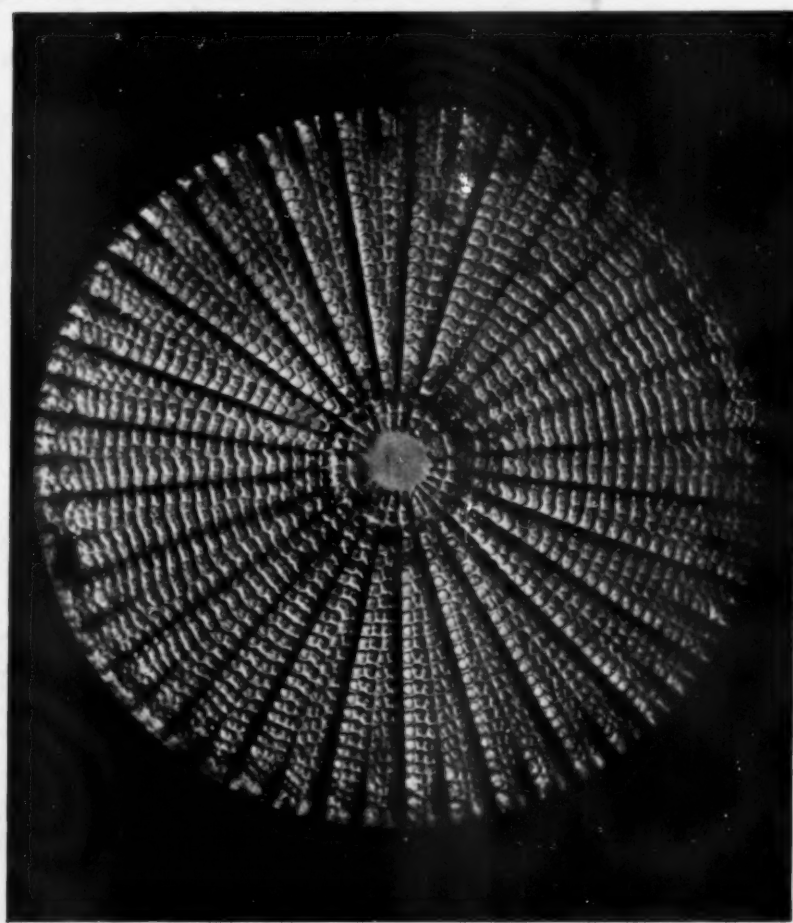
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DETROIT

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE.



February 5, 1938

Test for Lenses

See Page 89

A SCIENCE SERVICE PUBLICATION

Do You Know?

Shatter-proof glass with an organic instead of silicate base is being made in Germany.

There were about five million cases of malaria in the United States in 1934, a year which showed a sharp rise in this disease.

A municipal bathing pool on Long Island has two heroic-size statues, said to be the first large sculptures made in stainless steel.

Less than a century ago, so little was known about diphtheria that it was popularly supposed to be caused by smelling sewer gas.

A chemist points out that the human nose contains the most perfect air conditioner known—in the space of less than a cubic inch.

Cornell University has a school for missionaries on furlough, to teach nutrition, rural education, agriculture, and sociology of rural life.

Animals kept for a prolonged time at high camps on Mount Everest, above 21,000 feet, eventually died and it was found they had dilated hearts and fatty degeneration of all organs.

The Muscat grape has a history going back 3,000 years, and has been grown for centuries in dry lands around the Mediterranean, yet it seems to have acquired neither drought endurance nor the habit of rooting deeply.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

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A bathtub thermometer made of unbreakable and water-tight materials is being manufactured in Germany.

The old cabin of the Cherokee Indian Sequoyah in Oklahoma has been enclosed in a stone building, which will be a museum of Cherokee Indian exhibits.

A fire, which burned out 20 acres of thick coal in the Little Thunder Basin region in Wyoming, destroyed 2,700,000 tons of coal.

The disease of sleeping sickness in horses attacked over 88,000 horses in 1937, mainly in the West, killing thousands of animals.

SCIENCE NEWS LETTER

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MEDICINE

Fighting Cancer

Ignorance Greatest Cause of Cancer Deaths; Doctors Need to Refer Suspicious Cases to Experts

By JANE STAFFORD

DEATH takes 130,000 cancer patients every year in the United States. On their death certificates, on every one of the 130,000, cancer appears as the cause of death. Cancer killed these people, but in the vast majority of cases it was ignorance, not cancer, that was the cause of death.

A woman patient was ushered into the office of a well-known physician who has been a cancer specialist for 30 years. The patient and the doctor had been classmates in high school. The doctor was horrified to discover that his former classmate had a cancer of the breast which had spread to neck and armpit.

"Why, Ruth," he exclaimed. "Why didn't you come to see me about this long ago?"

She told him she had been to a physician in their home town. She had read an article that said a lump in the breast might be dangerous. She had a lump in her breast and she told her doctor about it. He examined her, told her she was all right, told her not to get cancer-phobia (fear of cancer), to go home and forget about it.

A few months later she read another article and went again to her physician. He laughed at her fears, assured her she had no cancer, nothing to worry about.

Finally, when a lump developed under her arm and another on her neck, she traveled way across the state to see her old school friend, the famous cancer specialist. By that time it was too late to remove the cancer. She was treated by the best possible methods, and her life was prolonged for several years. Then she died, cut down in the middle of her life, leaving half-grown children without a mother's care.

Her life might have been saved if she had had adequate treatment early, the specialist believes. He considers the doctor who saw her and failed to recognize the cancer, or to have her examined by a specialist, to be little less than a murderer.

Pain Not Early Symptom

Like that patient, the lives of half the persons who die of cancer every year could be saved if it were not for ignorance. Many of these victims are themselves ignorant of the early signs of cancer. Many physicians are ignorant of how to diagnose and treat the malady. The average person thinks pain is a sure sign. Pain does not develop until the cancer is far advanced.

Many physicians are ignorant about cancer because they do not see enough cases in the early stages to become familiar with the first symptoms. The general practitioner probably sees only two or three cancer patients in a year. Diseases like pneumonia, heart disease and scarlet fever make up the bulk of his practice, and he has learned to diagnose and treat them. Medical schools and medical societies might teach the doctors. Laymen and women, however, can

also help to prevent cancer deaths by learning the first danger signals of cancer and by going to a competent doctor at the first warning.

Cancer, however, is everyone's problem. Anyone can be afflicted. Generally cancer does not attack until the victim has reached middle age, although cases have occurred in infants and young persons. The reason for this, probably, is that it takes a long period for cancer to develop. Cancer can be produced in laboratory animals by painting their skin with coal tar or by injecting certain chemicals under the skin. The first injection or the first skin application, however, is not immediately followed by cancer. Only after many such injections, carried out over a long period, does cancer develop.

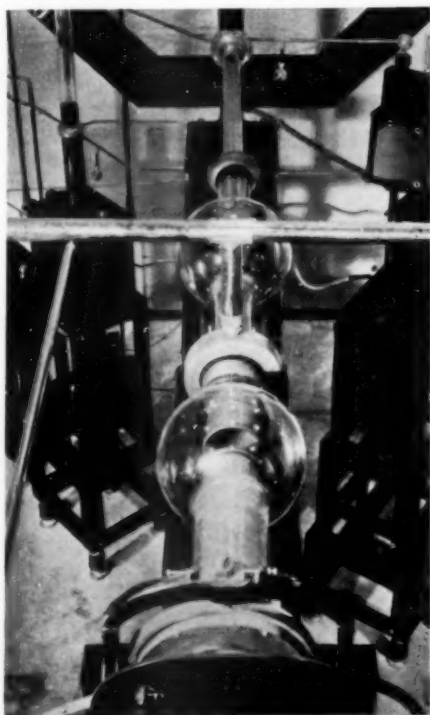
For Longer Lives

Most persons in this country can count on living to middle age. Very many of them can count on living longer if they have the courage to learn cancer's warning signals and to heed them promptly.

Medical scientists in laboratories all over the world are bending over microscopes, mixing and testing complex chemicals, examining patients and animals, trying to find out why people get cancer. Hundreds of thousands of persons are hoping that doctors will find a germ or a chemical or some single factor that is the cause of cancer.

Lives of cancer patients can be saved, however, without waiting for the results of these investigations. In fact, if and when a single cause for cancer is found, it may not provide any better method for treating cancer than is now available. Modern methods of treating tuberculosis, for example, save hundreds of thousands of lives annually, but they do not depend on the knowledge that tuberculosis is caused by the tubercle bacillus.

Many causes, that is, many conditions which can produce cancer in laboratory animals, have already been discovered. Some of these may play a part in causing cancer in human animals. Chemicals from coal tar cause cancers in mice. Some of these chemicals cause cancer in humans, such as chimney sweeps' cancer and mule spinners' cancer. The composition of these chemicals is very



CANNON OF MERCY

Cancer patients at Mercy Hospital in Chicago may receive treatment with X-rays from this giant million-volt tube. It is installed in a special room, heavily insulated with lead, to protect operators and patient.

much like that of chemicals formed in the body—bile acids and sex hormones. It may be, although it is not yet proved, that an occasional mistake or change in the body's chemistry results in the formation within the body of a cancer-causing chemical instead of one of the similar but harmless chemicals that ordinarily are manufactured in the body.

Viruses in Animals

One kind of cancer in rabbits, a warty condition called papilloma, can be produced by injecting juices squeezed from the wart-like growths. This, however, is a rabbit ailment and never occurs in human beings. Similarly, a virus has been obtained from a cancer-like chicken tumor which, when injected into fowl, causes the growth of new tumors or cancers. This does not mean, however, that cancer in man is caused by a virus. Mice develop cancers spontaneously and the cancers are very like those seen in men and women. By selective breeding, a family or strain of mice can be developed in which mice in every generation will develop cancer. This does not necessarily mean, however, that human cancer is inherited.

Cancer is probably not a single disease but many diseases, each with a different cause. Prolonged irritation of one sort or another will produce cancer in an individual with an inherent susceptibility to the condition. This is a generally accepted theory of how all and any kinds of cancer develop. From a practical viewpoint it leaves much to be desired because no one can put his finger on the inherent susceptibility and say, "Here it is; let's breed it out of the human race," and no one can tell all the possible kinds of irritation that should be avoided because they might play a part in causing cancer development.

Wild Spree of Growth

Cancer occurs when certain tiny cells of the body, called rest cells because they have reached a rest period in growth and development, go on a wild spree of growth, reproducing themselves at top speed and, because of their increasing numbers, crowding out other cells that are vitally needed by the body. What causes this growth spree is not known. No way of preventing it is known. If it is detected before it has gone very far, however, it can be stopped by cutting out the cells or destroying them with X-rays or radium.

Half the patients who die of cancer every year could be saved if they were properly treated in the early stages of



X-RAYS FOR VETERANS

This powerful but conveniently built X-ray tube administers treatment to deep tissues. It is in use in a hospital of the U. S. Veterans Administration.

the disease. Early cancer can be destroyed by radium or X-rays, or cut out by the surgeon's knife.

The problem is not to find a cure for cancer but to find cancer when it is curable.

The two most unfortunate things about cancer are: (1) In the early stages of cancer there is no pain or discomfort; (2) Although cancer begins locally, in just one spot, it soon spreads to take in a large area and to attack distant parts of the body.

Lord Moynihan's Wish

The eminent English physician, Lord Moynihan, once said, "If I had only one prayer, it would be that early cancer would give pain." That prayer has been echoed in the hearts of all physicians who see cancer patients too late. It has been said that no one would die of cancer if early cancer had the pain of a jumping toothache.

Cancer of the breast and cancer of the uterus or womb kill most of the 80,000 to 90,000 women who die of cancer every year in the United States. Most of these lives could be saved because cancers of breast, uterus and skin are the most readily curable of all forms of cancer, and they give the plainest early warning signals.

Cancer of the breast starts as a small lump. A single lump in the breast of any woman over the age of 30 years is serious. Unusual bleeding is a danger signal of cancer of the uterus. Women should not wait, however, for this warn-

ing. Cancer specialists agree that women who have had children should go every year to their doctors for examination and repair, if necessary, of the child-bearing organs.

More Women Victims

More women than men die of cancer. The ratio is approximately 60 to 40. As if to compensate for this uneven distribution, the majority of cancers in women are of the type that can be diagnosed early and treated effectively.

Cancer of the stomach causes most cancer deaths among men. Two-thirds, approximately, of stomach cancers are found in men. In about half these cases, unfortunately, no warning signal is given in time for the victim to be saved. In the other half of the cases of stomach cancer, the early symptoms are those of indigestion. All persons, men and women, who have chronic indigestion that does not respond to medical treatment should have X-ray examinations to see if cancer is present.

Cancer of the skin, mouth and lip is another form that is much more common among men than women. These cancers can be cured in almost 90 per cent. of the cases, but if allowed to go untreated, they may destroy irreparably large areas. Woman's vanity is considered a saving grace in such conditions, because few women would go for long with a large warty spot on the face. Women also seem to take better care of their teeth, and jagged edges of a broken tooth, or poorly fitting false teeth,

may cause enough irritation in the mouth to bring on cancer.

The job of finding cancer while it is still curable by surgery, X-rays or radium must be shared by patients and physicians. There is not now any single diagnostic test for cancer, as there is for diabetes, nor is there likely to be such a test in the future. The condition does not lend itself to such testing, because in the early stages it does not produce any change that would show in the blood. It does give warning signals. The important point is to learn these signals and heed them.

They must be heeded not only by patient but by physician. All doctors should know that early diagnosis of cancer is not made with the eye or the finger but with the microscope. This means that a bit of tissue from the suspected cancer must be cut out for microscopic examination. The procedure can be quickly and safely done, under local anesthetic so there is no pain. The doctor who delivers a baby, in the opinion of one cancer specialist, is responsible for seeing that the mother does not have cancer. This means that he must repair any tears of the uterus that occur and must see that the patient is regularly examined throughout her life to detect the earliest signs of cancer if it should develop.

Science News Letter, February 5, 1938

CHEMISTRY

High Purity Demanded of Cesium for Photocell Use

CESIUM, rare earth that makes the electric eye see, will not work if it contains more than one ounce of impurities in three tons of metal, reports Dr. J. J. Kennedy, of the Maywood Chemical Works, describing the cesium mining and purifying industry to the American Chemical Society.

Mined in the Black Hills of South Dakota, pollucite, the dull and gumlike ore of cesium, worth fifteen dollars a pound, contains from one to 30 per cent. of cesium oxide. Purified by successive stages, and reduced to a metal that burns in air and explodes in water, cesium is used as the sensitive metal in photoelectric cells—the “electric eyes” of industry—and as a “getter” in radio tubes. A radio tube “getter” burns up the last bits of oxygen that the vacuum pump couldn't catch.

Science News Letter, February 5, 1938

Cottonseed hulls are being used to fill joints between concrete highway slabs.

ENGINEERING

Engineers Seek Answer to Question: What Is a Draft?

What's One Man's Draft May be Nothing to Others; Different Shootop Climate Gives Most of Us Tough Ankles

JACK SPRAT, who ate no fat, and his wife who ate no lean have nothing on family arguments which arise over drafts. A draft for one person may not be a draft for another, and so the American Society of Heating and Ventilating Engineers have appointed a research committee to investigate the scientific bases of temperature and air movement which constitute a draft.

The report of F. C. Houghton, Carl Gutberlet and Edward Witkowski, working in the Pittsburgh laboratories of the Society, states:

“Drafts are probably the source of more complaints directed against ventilating and air conditioning systems than any other defect. Notwithstanding this fact, the engineer has no way of evaluating what constitutes a draft other than his own personal feelings. There is even a lack of understanding of just what is meant by a draft.”

The sensation commonly called a draft, explain the scientists, is feeling of local coolness in one part of the body while the rest of the body feels warm. Arguments about drafts arise because it is almost impossible for the average person to tell whether the local sense of coolness is caused by a stream of air (a real draft) or by local contact with air that is cooler than the rest of the air in a room. A person may also get a sense of local coolness because of radiation from the body to a cooler surface, like a cold wall or window. This feeling may be interpreted as a draft.

A draft then is any one, or all, of three conditions: excess movement of normal air, contact with cooler air, or radiation of a part of the body to a cold surface. A draft, while literally a movement of air, has come to mean a local coolness in the body and it is this mixed use of a single word which causes confusion.

To determine what combinations of temperature and air movement constitute a draft the research committee has been using test subjects in the laboratory.

To test a draft on the ankles the sub-

ject sits with his feet in separate cardboard boxes into which pours air of known temperature and humidity. Tiny thermo-couples enable investigators to know, at any time, the temperature of the ankles while the subject marks on a chart his feeling about the “draft.” Or, in another test, the stream of air may be directed at the neck.

Two findings have already been obtained. An air velocity increase of 15 feet per minute usually is equivalent to a drop in temperature of one degree. And the ankles stand a much lower temperature before a feeling of coolness is noted. This latter is explained by the fact that one's feet really dwell in a quite different temperature environment than the rest of the body. In a room where the temperature is 70 degrees at the waistline, the floor—and the feet and ankles—may be subjected to a temperature of 65 degrees.

Science News Letter, February 5, 1938

CHEMISTRY

Fund to Aid Search For New Farm Product Uses

SEARCH for industrial uses for farm products will be speeded up through the use of a \$500,000 grant by the Rackham Fund to Michigan State College. This is the first large-scale expenditure for the purpose, outside official appropriations by federal and state governments, and various grants by The Chemical Foundation. A \$2,000,000 appropriation for similar research is now pending in Congress.

In addition to the researches looking to industrial uses, one special objective of investigators at Michigan State College will be to make (if possible out of cornstalks, sawdust, straw, or other farm wastes) some material to be plowed into the soil for its physical improvement, as fertilizers are used for its chemical improvement. The sought-for material, by rendering the soil lighter and more porous, will increase its water-holding power, and thus indirectly make for better control of both floods and erosion.

Science News Letter, February 5, 1938

GENERAL SCIENCE

Scientists Organize to Aid International Activities

IN THESE days when international co-operation so often consists of one group of nations waging economic or military war against another group, it is refreshing to learn that scientists of various nations are strengthening their mutual bonds.

Latest move in this direction is the agreement that has been made, after some years of negotiation, between the International Council of Scientific Unions and the Organization Internationale de Co-operation Intellectuelle, which is a part of the League of Nations. Prof. Ch. Fabry of France and Sir Gilbert Murray of Great Britain signed the agreement on behalf of these two organizations.

Scientists who work in different countries and talk different languages often have at international congresses and meetings their only opportunity to meet each other and discuss their similar researches. Congresses and unions in the various branches of science which meet internationally every three or four years are a useful mechanism for keeping

science cosmopolitan. It is the function of the International Council of Scientific Unions to coordinate these activities.

The League of Nations through its intellectual cooperation activities, consisting of an international committee and an institute at Paris, deals with the more political aspects of scientific questions.

For instance, at this year's meeting of the International Council of Scientific Unions there was a proposal from the Royal Amsterdam Academy of Sciences for a continuing inquiry into the relation of science to the life of the community. The International Council decided to handle the more scientific aspects of this broad and important problem and referred other and perhaps more troublesome phases to the League's committee.

It will take time to get international action on such broad matters in these days and the most good will come from the discussions and controversies that will arise, not the resolutions that may be passed worded in formal language.

Science News Letter, February 5, 1938

EDUCATION

Intellectual Emigres Join American University Life

FOUR great political revolutions in as many countries, Russia, Italy, Germany and Spain, have taken place since the World War. They have had profound effects upon the intellectual life in the countries directly concerned and the rest of the world.

One of the first classes to suffer the effects of such a revolution is the university professor. Dr. Stephen Duggan, director of the Institute of International Education, has been the leader in rescuing those professors who fled from the turmoil, the restraints and freedom's death in the revolutions.

Most devastating of the revolutions was the Russian, in Dr. Duggan's opinion. It was economic as well as political. Hundreds of liberal professors who had fought the autocracy of the Czar fled to other lands because they could not live under a dictatorship of the

proletariat. Many of them able to speak no language but Russian, they found difficulty starting intellectual life anew. American aid was organized by Dr. Duggan's institution and a hand was extended to many emigre scholars, both professors and students alike, with gratifying results. In the years since some of them have risen to important places in American life.

Mussolini's Fascist revolution of 1922 was mild and primarily political as compared with the Russian. Practically no scholars and students fled to the United States.

The Nazi revolution was far more severe. The Jew was made the scapegoat and practically every Jew and "non-Aryan" was ousted from university positions. Hundreds of exiles went to other lands in the midst of a world depression. In America the Emergency Com-

mittee in Aid of Displaced German Scholars, the Rockefeller Foundation, universities and other agencies have spent about a million dollars in successfully meshing German exiles into our intellectual fabric.

Spain's international conflict and clash of ideologies has had its intellectual casualties. Some of the exiled professors are looking toward America.

Science News Letter, February 5, 1938

GENERAL SCIENCE

Decay of German Science Foreseen by Anthropologist

IF THE present situation in Germany continues for any length of time, the probability is that German science will decay. This is the rather sorrowful conclusion expressed by Dr. Franz Boas of Columbia University.

What has happened in Germany is important to the world at large because there is being destroyed a type of culture that had great and beneficial influence upon the course of science and research outside of Germany.

Dr. Boas observes that the aim of German education in the nineteenth century was to lead to intellectual freedom.

Now any clash of opinion which is "the very soul of intellectual life" has been crushed with Nazi control of schools, universities, scientific societies, and other institutions.

When the Nazi-trained younger generation displaces the scientists trained under the Empire and Republic, Dr. Boas expects that "the light that shone forth from school and university, from laboratory and quiet study will be dimmed and infinite labor and time will be needed to reestablish what has been lost."

Practical exploitation of physics and chemistry demanded by the exigencies of the economic situation may continue. But Dr. Boas feels that the present tendency is to look too much at immediate practical results and to disregard the importance of the advance of fundamental theory on which the greatness of German industry was founded.

Giving expert testimony on the idea of a "chosen race," Dr. Boas charges that the modern development of genetics and lack of clear thinking have led biologists and anthropologists to a hopeless confusion between characteristics that are racially determined and those formed by social environment. The innumerable books written on mental characteristics of races have "not a whit of scientific basis."

Science News Letter, February 5, 1938

PSYCHOLOGY

Consumer in Tough Spot Between Bunk and Debunk

IT'S TOUGH being a consumer these days, and rising prices are not the only reason. Efforts meant to protect and assist him promise, at the present rate, to make it increasingly harder for him to decide what to consume when he does get a few dollars together to meet the bill.

Consider the apparently simple matter of buying toilet soap or breakfast food or a hand lotion. Long before he gets around to buying one of these or many similar items, the consumer has been deluged by sales efforts of nation-wide advertising which these days takes the form of neighborly advice on his health, diet and beauty problems. (Mr. Consumer is told he has beauty problems as well as Mrs. Consumer.)

Pretty well worn down by the enthusiasm of advertisers and promoters and perhaps confused enough as to just which product he really wants or needs, the consumer is next subjected to assault by the enthusiastic debunkers who see deadly peril lurking in apparently every advertised health, food and beauty product, and who consider it their duty to warn

Mr. and Mrs. Consumer in terms even more lurid than some of the advertising they denounce. And if a product cannot be found dangerous to life and health, it can almost always be found too expensive.

Reliable investigations and analyses have shown that some nationally advertised and sold products are dangerous. It does seem that the consumer should be warned against these if he cannot be protected any other way. It would be too

bad, however, if the business of warning the consumer should become an ineffectual cry of "Wolf" or worse still, another racket. The rising generation of warners would do well to take a lesson from one of the ablest and most experienced of them and learn the power of ridicule.

Meanwhile the consumer, in the tough spot where bunk and debunk meet, needs to call on his heritage of Yankee horse sense, sales resistance and humor.

Science News Letter, February 5, 1938

MEDICINE

Too Much Fuss Over Blood Transfusions**Well Organized Hospitals Always Have Donors Available; Blood Bank Plan Now in Effect in Several Communities**

THE FRANTIC appeals for blood donors that are made to the public every now and then and the consequent "fuss and furore" are causing some concern to physicians in Indiana and, presumably, elsewhere.

Blood transfusions have an important place in medical and surgical practice, but the general excitement over them may have confused the public as to their actual value. With this in mind, the Indiana physicians have, through their state medical association, issued a clarifying statement.

"The principal value of a blood transfusion is to replace a patient's loss of blood," it is pointed out.

The usual cases which require blood transfusions arise from street and highway accidents, hunting casualties, and occasionally from home accidents such as a cut with a sharp instrument. In such cases the first duty to the patient is to stop the loss of blood and get him to the nearest hospital. If a transfusion is needed, the authorities at most well organized hospitals will be able to locate a donor during the interval while the patient is being given other attention.

A few communities have, besides the hospital lists of blood donors, so-called blood banks. These depend on the recently discovered fact that blood can be preserved for as long as a month. Blood from lifeless bodies of accident victims is removed, examined and, if suitable, preserved for future transfusions.

It is very rare, the Indiana State Medical Association points out, that a pa-

tient needs blood from a person who has recovered from a specific type of infection.

Another type of patient who may need a blood transfusion is the mother who loses much blood during childbirth. A maternity service in one city has prepared for this emergency by building up a blood bank into which each expectant mother may deposit some of her own blood, taken several weeks before her confinement.

Science News Letter, February 5, 1938

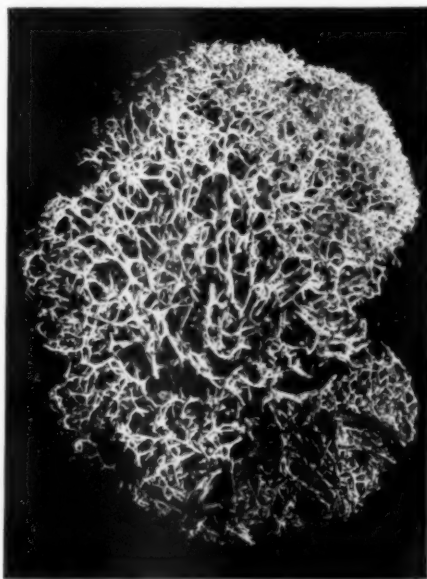
PSYCHOLOGY

Quiet Conversation Preferred by Hard-of-Hearing

DEAF people do not enjoy loud talk. When allowed to adjust the loudness of the voice to which they are listening, individuals with normal ears prefer to have it 38 decibels, or loudness units, above the level at which it is audible. Hard-of-hearing persons will adjust the same speech at a loudness only 23 to 20 decibels above their threshold of hearing. This was discovered in experiments at the University of Iowa by Dr. Noble H. Kelley.

Deaf ears function differently from normal ears, Dr. Kelley found. In speaking to those with normal hearing you will have most difficulty in making your consonant sounds understood; vowels sounds are most intelligible. For the deafened, the consonants are recognized practically as easily as the vowels.

Science News Letter, February 5, 1938

**REINDEER MOSS**

Reindeer and caribou, up in the Arctic lands, would often have a hard time in winter, if they could not scrape away snow and find thick mats of reindeer moss beneath. Tough chewing, of course, but the reindeer have good teeth. It is not a moss but a lichen. Neither is it confined to the Far North: it grows in the subtropics and even in the tropics.

GEOPHYSICS

New Magnetic Storms Cause Communications Trouble

A SUDDEN and severe magnetic storm, that began abruptly a few minutes before seven o'clock, E. S. T., and lasted all day long on Tuesday, Jan. 25, again disrupted telegraphic and wireless communication. It was the third and most violent of such disturbances in ten days. The Radio Corporation of America, from its Washington office, reported, however, that the ultra-short-wave setup from New York to Philadelphia had little difficulty with its seven-meter wave.

Western Union stated that frequent interruptions occurred throughout the day, reaching maximum difficulty about 6:15 p. m., and developing more trouble over the Alleghenies than along lines running north and south. There was a good deal of trouble in the Midwest communications also. Postal Telegraph reported difficulties all the way around the compass. Neither system was completely blanketed out, but succeeded in getting messages through in spite of temporary interruptions.

The magnetic storms are connected with the great displays of the Aurora Borealis that have been seen recently, but they have no relation to the unusually severe atmospheric storm that caused floods in the South and disabling snowstorms in the Midwest.

Science News Letter, February 5, 1938

SEISMOLOGY

Hawaiian Quake Followed By One in South Atlantic

HAWAII'S earthquake of Jan. 23 had its epicenter under the sea, about 21 degrees north latitude, 156 degrees west longitude. This is off the northeast coast of the island of Maui. Time of origin was 3:29.9 a. m., E. S. T.

Right on the heels of Hawaii's weekend earthquake came a second one, on Monday, Jan. 24, in a remote part of the world. Scientists of the U. S. Coast and Geodetic Survey gave its position as in the general neighborhood of the Sandwich Islands, east of Cape Horn in the South Atlantic. This quake started at 5:31.3 a. m., E. S. T.

Observatories reporting were: Williams College, Williamstown, Mass.; the Franklin Institute, Philadelphia, Pa.; the University of Montana, Butte, Mont.; the University of California, Berkeley, Calif.; the Dominion Observatory, Ot-

tawa, Canada; the Dominion Meteorological Observatory, Victoria, B. C.; the stations of the Jesuit Seismological Association at St. Louis University, Georgetown University, Fordham University, Canisius College, and Weston College; and the stations of the U. S. Coast and Geodetic Survey at Tucson, Ariz., and Honolulu, T. H.

At Honolulu, the report added, the instruments were wrecked.

Science News Letter, February 5, 1938

ARCHAEOLOGY

Gold Armor Clue to America's Prehistory

IN 1519, Spanish explorers in Panama saw with their own eyes Indian chief Parita decked for burial in golden mail. His shining armor included a helmet like a basin of gold. He wore tubes of gold on arms and legs, plates of gold on his chest, a golden belt hung with bells, and four or five gold necklaces.

Sixteenth century adventurers were impressed—by the gold.

Four centuries later, American scientists have explored a cemetery in Panama that confirms the glittering story. They have found no single individual so royally outfitted as Parita. But every type of ornament listed by the Spaniards has been unearthed, except the gold belt.

Twentieth century science is impressed—by the light these beautiful objects shed on our ancient history.

Dr. S. J. Lothrop of the Peabody Museum of Harvard tells of exploring this cemetery, in Cocle, Panama. From the styles of burial and from objects of metal, stone, and clay, he learns that ideas flowed north from South America in those days, very powerfully. Gold disks, big as dinnerplates, that Panama chiefs wore in battle, bore designs from South America's west coast. A crocodile god and crested crocodile were ornamental designs as familiar as our Goddess of Liberty figure is to us. Panama got its toothy animals in art from Peru.

Panama, says Dr. Lothrop, was the crossroads of the New World. There particularly may be found many clues to people and ideas that drifted from one New World continent to the other.

Newcomers entering via Bering Strait spread to the tip of South America. But there were backward currents of trade and migration, too.

It begins to appear that even the wonderful Mayas, whose civilization had so mysterious a start, may have come from the south, from South America.

Science News Letter, February 5, 1938

IN SCIENCE

ANTHROPOLOGY

Scientist's Hats Prove Continued Head Growth

KEEPING a record of sizes of hats he bought during 40 years gave Sir Flinders Petrie, 84-year-old British archaeologist, personal proof that his head has grown steadily, even after he was well past middle age.

A letter from Sir Flinders, who is now on an expedition in Palestine, has been received at the Smithsonian Institution, in confirmation of Dr. Ales Hrdlicka's recently advanced theory that the human head—and presumably the brain—may grow throughout adult life.

Sir Flinders states that he wore a six and one-half hat at 20 years; a seven hat was snug at 30; at 40 he bought seven and one-quarter; at 50, seven and one-half; and since then he has had some trouble wearing a standard size at all. His prestige as a leading British archaeologist, and his strenuous life exploring ruins in Palestine and Egypt, testify to the aged scientist's own comment that he is quite sound and normal.

Science News Letter, February 5, 1938

GEOLOGY

"Eyebrow of Dirty River" Studied by Geologist

GRIMLY glowering at the western edge of the Albuquerque Plain in New Mexico, a great black cliff, called the Ceja del Rio Puerco ("Eyebrow of the Dirty River," in English) tells geologists a weird tale of volcanic eruptions in the not very distant past, Dr. Kirk Bryan, Harvard University geologist, reports. (*Journal of Geology*, Jan.-Feb.) He and Dr. Franklin T. McCann, of Dayton, Ohio, studied the area.

Long ago, when the Rio Grande flowed in a channel 500 feet higher than the present one, they find, lavas from Mount Taylor, a volcano active before the ice ages, poured out over the plain. Later the rivers cut into the lavas, creating grim escarpments like the "eyebrow." Still later, the Rio Puerco cut into the headwaters of streams flowing into the Rio Grande from the west, "pirating" the waters.

Science News Letter, February 5, 1938

SCIENCE FIELDS

ASTRONOMY

New Features Discovered On Face of the Moon

REVISION of our maps of the moon may be necessary as a result of the discovery of a series of craters and walled plains, near the edge of our satellite's visible disk by H. Percy Wilkins, British astronomer.

Occupying twenty degrees of latitude on the southeast edge of the moon, this tangle of walled valleys, craters and high peaks has escaped discovery for many years, chiefly because nobody looked there carefully enough until now. Commenting on Mr. Wilkins' discovery, Dr. Walter Goodacre, acting director of the British Astronomical Society, recommended further observations of the moon's edges, which may lead to additional discoveries.

Science News Letter, February 5, 1938

PSYCHOLOGY

Children Learn Intolerance And Warlike Attitudes

CHILDREN early learn intolerance and warlike attitudes. They have their preferences among peoples and races, and the smaller their fund of information, the more illogical their prejudices are likely to be.

Rich children are the least tolerant, youngsters of the middle economic class the most tolerant, a recent study of more than 2,000 children by Dr. H. Meltzer, director of the Psychological Service Center, St. Louis, disclosed.

Country children are of the 100 per cent. American type. They are less tolerant and more nationalistic than are city children, Dr. Meltzer found.

But prejudice and extreme nationalism have been found also among a large number of city children in New York. There two-thirds of a group of 1,000 school pupils were unhesitating in their declarations that if the flag of the United States were insulted, we should go to war. They seemed to feel that there could be no question about it.

A smaller number believe that the killing of a countryman as in the Panay incident would be just cause for war.

In private school classes where instruction had been given on the futility of war, a contrasting picture was presented. There four-fifths of the group were opposed to war in the case of a flag insult. This tolerance is only lip service, however, it is emphasized by Dr. Arthur T. Jersild of Teachers College, Columbia University, who conducted this New York survey. Its shallowness is betrayed by the response when the children were questioned about an insult by a specific country such as Germany or Mexico.

Even the child most outspoken about war in general, reversed herself with regard to Germany because she "hated Hitler."

Although it may be assumed that these youngsters acquired their attitudes from their elders, they are no less significant on that account.

Science News Letter, February 5, 1938

TECHNOLOGY

New Dehydrating Process Promises Commercial Uses

A NEW, highly rapid method for dehydrating fleshy vegetables, which promises to have revolutionary effects in starch manufacturing and similar industries, is reported by E. F. Hopkins of the U. S. Department of Agriculture's laboratory at Laurel, Miss. (*Science*, Jan. 21.) The research was financed by a grant from The Chemical Foundation.

Dehydrating vegetables by processes now in use is costly because it takes so much fuel to drive the water out of the stubbornly retentive living cells. The heat also sometimes damages the tissues.

In the new process the vegetables, usually reduced to a pulp, are treated with a gas or vapor of some fat-dissolving substance such as chloroform, sulphur dioxide, or carbon tetrachloride. This makes a quick kill of the cells and permits their watery contents to ooze out. After this it is much easier to evaporate the water. The poisonous gas is driven off at the same time.

Mr. Hopkins, however, cautions that "wide claims for the dehydration of vegetables for food use should not be made." This is because much of the soluble food elements ooze out of the cells with the water—such things as vitamins, mineral salts, and flavors. However, the process has great promise for such industrial applications as starch manufacture from sweet potatoes and white potatoes.

Application for a public service patent on the process has been made.

Science News Letter, February 5, 1938

GEOLOGY

Geologists Check Age of First "Miss Minnesota"

SHE WAS only a hunter's daughter, sought after, perhaps, by a few men of her tribe during her brief lifetime of 15 years or so. One day she vanished and was seen no more for 20,000 years. It was probably another boating accident.

This is the story of America's famous "Minnesota Girl" which many geologists now accept.

Studying the bones, and the site where they were found, geologists debated their age. Did the bones fall to the bottom of the lake along with the sediments, or were they buried there later? One group of geologists decided, after a field study of adjacent areas, that "Miss Minnesota" was perhaps only 500 to 1,000 years old, the bones having been buried long after the silts around them had been deposited, while another group were equally certain that her bones were buried when the silts were formed.

Now, Dr. George F. Kay, of the University of Iowa, collaborating with Dr. Morris M. Leighton, of the Illinois Geological Survey, has assured members of the Geological Society of America that the bones were as old as the sediments in which they were found. These sands and gravels have already been dated as from 18,000 to 20,000 years old.

Seven years ago, digging in gravels that were once lake bottom, road workers in northern Minnesota uncovered her remains, ten feet below the surface. The lake in which she had been drowned had filled up, and was dry land. Even the legends of her tribe, which many generations before her death had wandered into the New World from Asia, are forgotten.

Science News Letter, February 5, 1938

MICROSCOPY

Diatom Shell Markings Test Quality of Lenses

See Front Cover

DIATOMS, tiny one-celled water plants of a myriad forms, have long been standard test objects for microscopes. The exceedingly fine sculpturings and markings on their silica shells defy any but good lens combinations to bring them into sharp definition. On the cover of this week's SCIENCE NEWS LETTER is the picture of one, a wheel-shaped form, taken with a new small-camera photomicrography set-up developed in the Kodak Research Laboratories.

Science News Letter, February 5, 1938

MATHEMATICS

Intercollegiate Competition Held for Mathematics Prizes

Winning Teams Will Bring Glory and Cash to Both Alma Mater and Themselves; \$1,000 Fellowship at Top

A NEW intercollegiate competition, which will pay off in glory and cash for proficiency in mathematics, is being sponsored by the Mathematical Association of America, it is announced here by Dr. W. D. Carins, secretary of this organization, whose nearly 2,000 members teach on college and university faculties.

Football fans who yearly scan the listing of collegiate football team rankings will soon be able to learn the rating of America's college teams in higher mathematics and what schools were "licked" by advanced calculus, analytical geometry or differential equations.

First prize in the annual competition will mean \$500 to the winning department of mathematics. Second and third prizes will be \$300 and \$200 to the respective departments. If these funds are used for the purchase of books, suitable book plates commemorating the prize winning competition will be made available to the departments.

Awards to Individuals

To each of the three members of the prize-winning team medals and \$50 will be awarded. Members of the second and third prize-winning teams will each receive \$30 and \$20 respectively.

As now planned there will be no individual competition between schools so that the visions of "Harvard 2—Yale 1" will still continue to mean baseball or hockey rather than mathematics. On a specified day, throughout the country, teams from all the colleges entering the contest will stand the same examination, which will last a total of six hours. Qualified, disinterested graders will mark the papers of each contestant and submit their marks to the Mathematical Association. Its committee will then determine the winning teams by totalling the separate grades of team members.

To the five students who stand highest in the entire country comes the chance for an additional honor. From this list of five will be selected one person who will receive a \$1,000 one-year

scholarship at Harvard University, or at Radcliffe in the case of a woman.

Funds for the medals, cash prizes and the scholarship will come from the William Lowell Putnam Intercollegiate Memorial Fund, left by Mrs. Putnam in memory of her husband, a member of the Harvard Class of 1882.

The competition is open only to undergraduates who have not received a degree. Full details of the competition will be announced in the forthcoming issue of the American Mathematical Monthly and by letter to the heads of departments of mathematics in colleges and universities.

Science News Letter, February 5, 1938

INVENTION

Planning Invention's Future Seen as National Need

THOSE who want to look ahead and make some sort of plans for bettering the world around us—as experts for the National Resources Committee recently attempted to do—are confronted by two contradictory objections:

1. We cannot plan because the world is changing.
2. We cannot plan because nothing human can be changed.

Prof. Charles E. Merriam, University of Chicago political economist, also National Resources Committeeman, observes that one of these ideals must be wrong. He and other federal planners are convinced that both are wrong.

To the American Institute in New York City recently Prof. Merriam explained that if business men and government administrators took seriously the idea that it is impossible to make plans based upon the shifting foundation of present changes, they would have to fold their hands and watch the approach of change with mere idle curiosity.

It is possible to forecast what is likely to happen and prepare for it. As Prof. Merriam put it:

"From the known we build out into the relatively unknown, struggling to

anticipate alternatives as best we may, realizing that mistakes will be made and that waste and loss will be found, but balancing the hope of larger gain against the smaller loss."

Some have paraded the specter of government monopoly in research. They see the government taking in hand all forms of invention and drying up the springs of advance. Prof. Merriam considers this a far cry from what the National Resources Committee actually proposed.

Noteworthy scientific advances made over the decades by the scientists of Uncle Sam's research institutions and their application to industry belie any such fear. What the planners are urging is continued consideration of new discoveries and their social implications by appropriate government agencies.

Invention is "a basic process in our national economy." Invention should be stimulated and at the same time the work-a-day world should be cushioned against temporary unemployment and obsolescence that our research may bring.

Science News Letter, February 5, 1938

CHEMISTRY

DuPont Co. Establishes 24 Fellowships For 1938-9

TWENTY-FOUR fellowships, six post-doctoral and eighteen post-graduate, will be awarded during the academic year 1938-9 by E. I. du Pont de Nemours and Company. These awards, made annually for the last 20 years, are offered to encourage promising students in chemistry.

Eighteen institutions, University of Chicago, Columbia University, Cornell University, Harvard University, University of Illinois, Johns Hopkins University, Massachusetts Institute of Technology, University of Michigan, University of Minnesota, University of North Carolina, Ohio State University, Pennsylvania State College, University of Pennsylvania, Princeton University, Stanford University, University of Virginia, University of Wisconsin and Yale University, will benefit under this plan. These institutions will select both the men and the subjects to be worked on under this fellowship plan, with no restrictions of any kind placed on the type of work undertaken.

The six post-doctoral fellowships will be allotted \$2,000 each, with an allowance of \$1,000 for equipment needed by the six, while the eighteen post-graduate fellowships will be allotted \$750 each.

Science News Letter, February 5, 1938



LARGEST PRIMITIVE AREA

Dust devils and dinosaur bones occur everywhere in this vast desert wonderland recently explored in southeastern Utah by the U. S. Geological Survey. The rim rock here was laid down during the age of dinosaurs, 100 million years ago, when the arid lands were the shore of a shallow sea. The rocks are similar to the Mesa Verde formation, so puzzling that for years it was called "alibi sandstone" by oil geologists.

ARCHAEOLOGY

Peruvian Mummies Come to New York

TWO prehistoric visitors from Peru—mummies more strangely swathed than Egypt's ancient kings—have been unwrapped for the American public to behold.

At the American Museum of Natural History, where the Peruvian mummies are temporarily displayed, the first and biggest bundle proved to be no less than 60 layers of clothing, with a huddled mummy of a man in the heart of the wrappings.

Shawls and ponchos covering this American mummy show the wonderful textile arts of Indians in this region. Cats and monkeys are outstanding designs embroidered and woven into the materials. Bundled into the mummy wrappings, the museum curators found ears of corn, peanuts, and other food for the dead; also a calabash, which was possibly an ancient hip-flask, judging by a congealed substance in it, which may once have been a liquid.

The mummy was equipped with a false head made of wrappings. Trinkets of gold in the bundle include two sticks mounted with goldfish hammered out of gold, and a golden disk over each ear of the mummy decorated with a row of seven cut-out cats.

Science News Letter, February 5, 1938

GEOCHEMISTRY

Nature Changed the Rules Ten Billion Years Ago

Something Radical Happened to Radioactive Elements Now on Earth, Long Before This Planet Was Formed

NATURE changed the rules of the game of radioactivity 10,000,000,000 years ago, probably long before the earth was formed. It was then that potassium, an element essential to life, began disintegrating radioactively, Dr. A. K. Brewer, chemist of the U. S. Department of Agriculture here, has determined.

Measuring the rate of breakdown of potassium into a kind of calcium, a component of limestone, then determining the time that this breakdown has been going on from the amount of this calcium now existing, Dr. Brewer finds that the process has been going on for about 10,000,000,000 years. In reaching this figure, he assumes that all of this special calcium, which has an atomic weight of 40 instead of 40.08 as does ordinary calcium, was derived from the breakdown of potassium, and that the breakdown rate has been uniform since it started. A similar time has elapsed since a variety of rubidium, a rare earth, started to break down into a kind of strontium, another rare earth.

Attempts to determine our planet's age by studying the end products of radioactive breakdown, such as calcium derived from the decay of potassium, may be as futile as trying to find out how old a stove is by weighing the ashes. The method will show, Dr. Brewer believes, how long the disintegration has been going on, or more

simply, how long the fire has been burning.

Dr. Brewer's new studies in no way affect the ages determined for a number of rocks by radioactive methods. The amount of uranium, another radioactive element, in rocks is measured and then compared with the lead which it has added to the rock by uranium's previous decay. The oldest rocks, dated by this method, are about 1,500,000,000 years old.

With earth age estimated from a number of sources at not more than 2,500,000,000 years, some of the breakdown of potassium must have occurred before earth was formed. Under present theories, the breakdown began on the sun, seven or eight billion years before that little star was torn apart to create the solar system.

How matter behaved under the old

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● RADIO

February 10, 4:00 p. m., E.S.T.
POWERFUL X-RAYS—Lauriston Taylor of
the National Bureau of Standards.

Feb. 17, 4:00 p. m., E.S.T.
OLDEST CITY IN THE WORLD—Prof.
E. A. Speiser of the University of
Pennsylvania.

In the Science Service series of radio discussions led by Wadson Davis, Director, over the Columbia Broadcasting System.

rules, in force until ten billion or so years ago, before the formation of the solar system, Dr. Brewer will not state. His studies give no clue to older, now nonexistent states of matter.

Life, in the early days of our planet, hundreds of millions of years ago, may have been greatly affected by the radioactivity of potassium, says Dr. Brewer. Potassium is necessary to life, and if the minute fraction that is radioactive gets into a plant or animal, its radiations may damage the plant or animal and cause a sudden change of form, called a mutation.

Recently, by exposing fruit flies to X-rays, similar to radium radiations, Dr. Calvin Bridges, California Institute of

Technology geneticist, was able to produce freak flies in a very few generations. Millions of years ago, when radioactivity was stronger than at present, changes in life forms may have been greatly accelerated by radiations from this type of potassium.

Studies of the ages of rocks, using radioactive potassium as the clock, indicate to Dr. Brewer that their age cannot exceed 6,000,000,000 years, and probably they are very much younger. Disintegration long ago of other elements, now completely broken down, may make this age entirely too large. More work on radioactivity, leading to a more exact, and probably smaller value for rock age, is suggested by Dr. Brewer.

Science News Letter, February 5, 1938

CHEMISTRY

Oil's Hidden Chemicals Rival Products From Coal

COAL, particularly its sticky, uninviting tar, has been the wonder raw material of chemistry, showering the world with a multitude of dyes, drugs and other products.

Petroleum, considered useful primarily as a source of oil and gasoline for motor fuel, is being demonstrated as the source of hidden chemical riches.

This modern metamorphosis of oil is accomplished by the process of cracking, which consists of distilling the petroleum under heat and pressure to separate out its various components.

Cracking produces many more gallons of better gasoline than nature can manufacture. Dr. Gustav Egloff, research chemist for the Universal Oil Products Co., calls the cracking process a mighty conservation measure because without it some two barrels of crude oil would be needed where only one is used today.

In addition to motor fuel production, cracking has allowed the chemist to synthesize new substances from crude oil and to found new industries. It has given birth to a host of new products such as polymer and isooctane gasolines, lubricating oils, drying oils, resins, ethers, alcohols, glycols, chlorinated compounds, alkylated paraffins, aromatics and phenols.

The unsaturated gases and liquids or their derivatives from cracked products have found important uses in ripening of fruits, as growth promoters, and for maturing potatoes and nuts. Ethylene

and propane have found application as anesthetics in surgery.

The day is foreseen when the chemist will give industry essentially pure hydrocarbons from petroleum instead of the complex mixtures of our present gasolines and lubricating oils.

It is predicted by Dr. Egloff that the motor fuels of the future will be composed of but few if not single hydrocarbons, with more than double today's efficiency. Just now the fuel is ahead of the motors, as the chemist has ready an aviation motor fuel with an octane rating of over 100. No available engines will utilize efficiently that quality of fuel.

Science News Letter, February 5, 1938

METALLURGY

Spongy Iron Substituted For Lead Joint Packing

SPONGY iron that is soft and malleable like lead and employable for some of the same purposes has been developed in Germany by a physicist, Dr. Hans Vogt, after many years of effort. The material has the further advantages that it is much lighter, lower in price, and can be produced from native ores instead of being expensively imported.

One of the common uses of lead is for packing around iron plumbing; it is hammered into joints between the pipes. The new spongy iron is very well adapted for this use.

Science News Letter, February 5, 1938

PHYSICS

Water, Seemingly Formless, Has Definite Structure

Honeycomb Pattern Demonstrated in Very Cold Water; Weakens, But Persists, as Temperature Increases

SCIENTISTS are disclosing by direct evidence the structural nature of that most familiar of all chemical compounds—common water. School boys and many trained chemists alike speak glibly of water as H_2O , and then virtually dismiss it from further consideration.

The reason for this superficiality, said Dr. James H. Hibben of the Geophysical Laboratory of the Carnegie Institution of Washington before the meeting of the American Association for the

Advancement of Science, is that the simple formula H_2O is about all that anyone has known directly about water until fairly recently.

By experiment, Dr. Hibben added, scientists had been able to make surmises about the nature of water and on these surmises superimposed further speculation. Out of it all came some very intelligent guesses on the nature of water but the result was, after all, pretty much hypothesis. The arrangement of the two hydrogen atoms and one oxygen atom in the molecule, their distances apart and the binding energies between the atoms were all vital matters on which science relied on deduction for its conclusions.

The technique of Raman spectra, in which liquids scatter intense light in peculiar fashion for analysis in spectroscopes, is the tool which is yielding first direct evidence of the structure of water, said Dr. Hibben. The lines on the spectrogram plates tell directly information about the configurations of the atoms in molecules and the interatomic forces which bind molecules together.

Framework for Migrations

Splashy, fluid water may seem the most spineless of all things, declared Dr. Hibben, but in reality measurements show it has a structure. In the frozen state of ice, of course, this structure is very evident. But as one passes to the liquid state the structure persists. Very cold water has a quite definite structure which can be likened to a sort of honeycomb through which the molecules of water move in and out of the framework. As the experimenter studies the structure at higher and higher temperatures the water structure grows weaker but continues to persist. It does not disappear completely, said Dr. Hibben, until the critical temperature of water is reached at 371 degrees Centigrade. These measurements were carried out under pressure, he added, because water normally would boil at 100 degrees Centigrade.

The powerful tool of Raman spectra

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studies has also disclosed new findings which may affect chemical industry. In particular the making of sulfuric acid and the manufacture of explosives where sulfuric and nitric acid are both used have potential benefits to be derived from Dr. Hibben's studies.

"For many decades," declared Dr. Hibben, "it has been customary to write the formula for sulfuric acid as H_2SO_4 . As a result of Raman spectra investigations it can be demonstrated that at no time is this formula correct."

Fuming sulfuric acid has been shown to have the formula $H_2S_2O_7$. Sulfuric acid, itself, appears to be essentially a solution of sulfur dioxide (SO_2) in water.

Improved Explosives

Similar studies on the nature of nitric acid, concluded Dr. Hibben, show that the commonly accepted formula of HNO_3 is equally incorrect.

When sulfuric and nitric acids are combined, as in the manufacture of gunpowder and other explosives, the combinations occurring have not been well recognized. Mostly the art of making explosives has grown up empirically, through the years, without an exact knowledge of the essential ingredients used. With new knowledge now available it may be expected that better explosives should result in the future, but Dr. Hibben was unwilling to forecast this step as an outgrowth of his work.

Dr. Hibben's studies of sulfuric and nitric acid were made as part of the general problem of the Geophysical Laboratory in understanding the constitution of compounds as part of the essential knowledge necessary for fathoming geophysical problems.

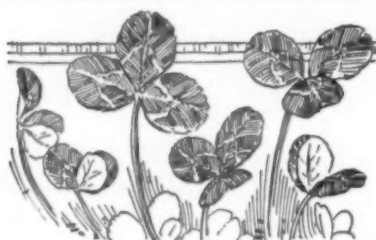
Science News Letter, February 5, 1938

Taller than the Empire State Building in New York, the "Palace of the Soviets," which is being built in Moscow, is to reach 1,300 feet.



CAN STILL CHASE CATS

Paul, a Philadelphia dog belonging to the family of Dr. George C. Kieffer, lost his own leg seven years ago while chasing a cat. During that time, unlike most dogs who have been fitted with man-made legs, he has learned to use his artificial limb as though it were his own. Here he is showing off his new limb, which is made of aluminum. It had several predecessors, made from a variety of materials, but so much did Paul use the leg that the limbs all wore out.



Electricity and Skeletons

ELECTRICITY, working on myriads of skeletons from which life departed millions of years ago, will do much to prolong the life of our own civilization.

This apparent paradox, which modern science makes real and even commonplace, is explained and emphasized in the new annual report of the Tennessee Valley Authority. New processes for making better phosphate fertilizers in electric furnaces promise to revolutionize the whole fertilizer industry, and with it agriculture, and with agriculture the tenure of civilization itself.

But where do the skeletons come in? In the phosphate rock. Indeed, to a very large extent, they *are* the phosphate rock—it consists of thick deposits of ancient animal skeletons, ranging from fish down to one-celled organisms, left on the bottoms of ancient seas and since pressed and hardened into stone.

Electric-furnace method of preparing phosphate fertilizer does two things: it makes a much more concentrated, effective fertilizer, that costs less in freight

from furnace to field; and it makes possible the economic utilization of lower grades of rock than can be worked by present methods, and that without the use of sulphur now required.

Even without waiting for the full developing of the electric-furnace method, TVA phosphates have been put into wide use in many places throughout the Valley and in several states outside. Distributed with the strict understanding that they are for use only in soil-restoring plantings, TVA phosphates are establishing pastures, checking erosion, and capturing six pounds of nitrogen

from the air for every pound of phosphorus, through the agency of plants which they fertilize.

Important for the power and navigation use of the river itself is the development of the Valley phosphorus program. For if the great reservoirs behind the dams fill up with erosional silt, the whole vast project comes to naught. Insuring that water for these reservoirs comes from grass-floored valleys, not from crumbling gulleys, is not the least of the tasks of phosphates from the furnaces of the TVA.

Science News Letter, February 5, 1938

GEOLOGY

Volcanoes Are Great Miners; Bring Wealth From the Depths

BOILING floods of lava and glowing clouds of gas are not the only products of volcanoes, geologists find. Many volcanoes have brought useful and valuable minerals—gold, silver, diamonds, or oil, close to the surface where men can get at them.

Reporting his field findings to the Geological Society of Washington, Dr. A. H. Koschmann, of the U. S. Geological Survey, told of the Cripple Creek volcano near Pikes Peak, Colorado, whose eruption 25 million years ago brought millions of dollars worth of gold into the rocks near the surface, where it could be reached by mining operations.

After the first eruptions, the crater floor collapsed, carrying leaves and tree trunks deep into the earth, where they are now found as fossils.

Near Silverton, Colorado, a similar

volcano brought 250 cubic miles of new material to the surface at about the same time as the Cripple Creek eruption. This created the famous Camp Bird mining area, which built the fabulous fortune of the late Tom Walsh, it was reported by Dr. W. S. Burbank, also of the U. S. Geological Survey. To date, more than \$270,000,000 in gold and silver have been mined in the San Juan area near Silverton, of which \$30,000,000 came from Camp Bird. After the first eruption of the Silverton Volcano, one of the craters, eight miles in diameter, collapsed, opening hundreds of fissures in the surrounding rock, which were later filled with rich deposits of gold and silver, some of them five to seven miles long.

Volcanic activity in the ancient Gulf Coastal Plain, an area which now includes Texas, Arkansas, and Mississippi, brought diamonds to Arkansas, and formed oil traps in other areas, Dr. Hugh D. Miser, of the Geological Survey, stated. Erupting eighty million years ago, the ancient volcanoes were discovered during drilling operations only since 1915.

New Mexico, a million or so years ago, had a volcanic lake in the Valles Mountains similar to the present Crater Lake in Oregon, Dr. C. S. Ross, government geologist, reported. This crater, which is the largest explosive crater known, was 17 miles long and 13 miles wide.

Science News Letter, February 5, 1938

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• First Glances at New Books

Additional Reviews

On Page 96

Biography

EDWARD WILSON OF THE ANTARCTIC: NATURALIST AND FRIEND—George Seaver—*Dutton*, 301 p., illus., \$3. A tragic, but inspiring, biography of the geologist of the second party to reach the South Pole. Between the lines of this beautifully-written work can be read the galling agony of frostbitten feet, and the irresistible determination of a man who wouldn't quit. This book is an epic of thorough workmanship, of jobs well done when work was impossible by ordinary standards, of men who travelled over the frozen wastes until flesh and blood could stand no more—and then went grimly onward, only to perish eleven miles from a food and fuel cache that would have saved them. Worth reading several times.

Science News Letter, February 5, 1938

Chemistry

LABORATORY TECHNIQUE IN ORGANIC CHEMISTRY—Avery Adrian Morton—*McGraw-Hill*, 261 p., \$2.50. In compact form are presented the fundamentals of common laboratory operations, together with a detailed treatment of theory and practice. The aim is to supply, in abridged and up-to-date form, material formerly found only in larger and now out-dated books.

Science News Letter, February 5, 1938

Photography

UNIVERSAL PHOTO ALMANAC AND MARKET GUIDE, 1938—Karl A. Barleben, Jr., ed.—*Falk Pub. Co.*, \$1. A well gotten up "how-when-and-where" book for photographers.

Science News Letter, February 5, 1938

Photography

NEWS PICTURES—Jack Price—*Round Table Press*, 192 p., \$3.50. Any photographer, amateur or professional, beginner or old-timer, can learn much from this volume. It is well written, beautifully illustrated, complete and thoroughly modern.

Science News Letter, February 5, 1938

Metallurgy

SHEET METAL WORK—William Neu-becker—*American Technical Society*, 360 p., illus., \$2.50. A self-instruction manual on the technique of working sheet metals.

Science News Letter, February 5, 1938

Sociology

NEW HOMES IN OLD COUNTRIES—Herbert Undeen Nelson and Marion Lawrence Nelson—*National Assn. of Real Estate Boards*, 123 p., \$1.25. What

Europe is doing to solve the problem of homes for its people, as seen during motor trips to nine countries. "Out of shacks and huts and slums the common people are pouring into modern apartments and garden homes."

Science News Letter, February 5, 1938

Zoology

THE PHILADELPHIA ZOO, Vol. I, No. 1—*Zool. Soc. of Philadelphia*, 50 c. a year. A small bulletin which will be published in the interests of the Philadelphia Zoological Garden. The lead article in this initial number is about Komodo Dragons, by Roger Conant.

Science News Letter, February 5, 1938

Psychology

REDISCOVERING THE ADOLESCENT—Hedley S. Dimock—*Association Press*, 287 p., \$2.75. A foreword by Dr. Hugh S. Hartshorne introduces this book on personality development of boys by a man interested in character education. It is published under the auspices of the International Committee of Young Men's Christian Associations.

Science News Letter, February 5, 1938

Child Psychology

THE DEVELOPMENT OF CHILDREN'S CONCEPTS OF CAUSAL RELATIONS—Jean Marquis Deutsche—*Univ. of Minnesota*, 104 p., \$2. A report of group tests administered to 732 school children between the ages of 8 and 16. Piaget's pioneer work was used as a point of departure for this study.

Science News Letter, February 5, 1938

Psychology

ANIMALS AND MEN: STUDIES IN COMPARATIVE PSYCHOLOGY—David Katz—*Longmans*, 263 p., illus., \$4. The professor of psychology at the University of Stockholm contributes these studies comparing the mind of man with animals. Particularly timely because of the present interest in mind reading is a review of the accepted explanations of certain "mind reading" animals and "talking" horses.

Science News Letter, February 5, 1938

Psychology

THE DEFINITION OF PSYCHOLOGY. AN INTRODUCTION TO PSYCHOLOGICAL SYSTEMS—Fred S. Keller—*Appleton-Century*, 111 p., \$1. This small volume is designed to serve as an orientation for those who want only a bird's-eye view of psychology and as a preview for those who plan to study the subject intensely.

Science News Letter, February 5, 1938

Biography

THE AUTOBIOGRAPHY OF ISAAC JONES WISTAR, 1827-1905—*Wistar Inst. of Anatomy and Biology*, 528 p., \$5. Although not primarily a scientist, Gen. Wistar took a keen interest in science, particularly during the latter part of his life. This interest resulted in the establishment and endowment by Gen. Wistar of the Wistar Institute of Anatomy and Biology, which was, in a way, an outgrowth of the Wistar Museum established at the University of Pennsylvania by his great uncle, Dr. Caspar Wistar. The Wistar Institute is known to scientists throughout the world and many of them will be interested in this autobiography of its founder and in the historical account of the Institute given in the appendix. Interest in the book itself, however, is not limited to scientists. The general reader will find it a stirring account of pioneering in the Northwest, of the days of the Vigilantes in California, of seafaring life in the days of sailing vessels, of the Civil War and of the financial aspects of railroad developments following that war.

Science News Letter, February 5, 1938

Technology

MODERN GLASS WORKING AND LABORATORY TECHNIQUE—M. C. Nokes—*Chemical Publishing Co., of N. Y.*, 153 p., \$3. This British text on the tricks of the glassblower's art should be available in every chemistry and physics department which cannot afford its own glassblower.

Science News Letter, February 5, 1938

Educational Psychology

PSYCHOLOGY OF ELEMENTARY SCHOOL SUBJECTS—William Henry Gray—*Prentice-Hall*, 459 p., \$3.25. A teacher training textbook in which the author attempts to present a more important experimental research in this field.

Science News Letter, February 5, 1938

Conservation

ANNUAL REPORT OF THE TENNESSEE VALLEY AUTHORITY FOR THE FISCAL YEAR ENDED JUNE 30, 1937—*Govt. Print. Off.*, 446 p., 60 c. (See page 94.)

Science News Letter, February 5, 1938

Archaeology

COCLÉ, AN ARCHAEOLOGICAL STUDY OF CENTRAL PANAMA; Part I—Samuel Kirkland Lothrop—*Peabody Museum of Harvard Univ.*, 354 p., 271 figures, 3 color plates, \$12.50 cloth, \$10 paper. (See page 88.)

Science News Letter, February 5, 1938

•First Glances at New Books

Additional Reviews
On Page 95

Medicine

SYPHILIS, THE NEXT GREAT PLAGUE TO GO—Morris Fishbein—*David McKay*, 70 p., \$1. Simply and without embellishment, the editor of the American Medical Association Journal tells the plain facts which everyone should know about syphilis. Photographs of how blood is taken for a Wasserman test, how spinal fluid is withdrawn for testing, how bismuth is given in treatment and of what syphilitic teeth and eyes look like add to the text.

Science News Letter, February 5, 1938

Psychology

EMOTIONAL HYGIENE: THE ART OF UNDERSTANDING—Camilla M. Anderson—*Lippincott*, 242 p., \$2. Perhaps no one needs an understanding of human emotions and the tragedy of mental imbalance more than does a nurse. This book by the assistant professor of nursing education at Duquesne University is intended for nurses.

Science News Letter, February 5, 1938

Psychology

PERSONALITY AND OTHER THINGS (A SEMI-AUTOBIOGRAPHY)—Harold Hays—*American Physician, Inc.*, 163 p., \$2. The author of this autobiographical volume is a practicing physician with Army service as a part of his experience. The fact that he is also a novel writer and inventor lends unusual color to his memoirs. The book carries an introduction by Dr. Henry C. Link, psychologist.

Science News Letter, February 5, 1938

Psychology

OUTLINE OF ABNORMAL PSYCHOLOGY—Raleigh M. Drake—*Longmans, Green*, 136 p., 75 c. This little book is not a text but literally an outline intended to organize the subject matter in the student's mind and to assist him to remember it.

Science News Letter, February 5, 1938

Psychology

INTEGRATION, ITS MEANING AND APPLICATION—L. Thomas Hopkins and others—*Appleton-Century*, 315 p., \$2. A book for educators by the professor of education, Teachers College, Columbia University.

Science News Letter, February 5, 1938

Education

THE HORACE MANN KINDERGARTEN FOR FIVE-YEAR-OLD CHILDREN—Charlotte Gano Garrison, Emma Dickson Sheehy, Alice Dalglish—*Teachers College, Columbia Univ.*, 146 p., illus., \$1.85. Those interested in nursery schools and kindergartens or the training of young children

will like this well-illustrated description of the pupils at a famous research kindergarten and discussion of what they are taught.

Science News Letter, February 5, 1938

Psychiatry—Autobiography

OUT OF MY LIFE AND WORK—August Forel; Trans. by Bernard Miall—*Norton*, 352 p., \$3.75. Very interesting is this scientific account of Dr. Forel's life and interests. His study of ants began as a hobby when he was a very small boy. The story of early work on mental disease is that of a pioneer in scientific approach.

Science News Letter, February 5, 1938

Education

MOTION PICTURES IN EDUCATION—Compilers: Edgar Dale, Fannie W. Dunn, Charles F. Hoban, Jr. and Etta Schneider—*Wilson*, 472 p., \$2.50. Resulting from the activities of the American Council on Education's Committee on Motion Pictures in Education, this is a summary of the literature relating to how visual education can be used in the schools.

Science News Letter, February 5, 1938

Photography

THE SECRETS OF TRICK PHOTOGRAPHY—O. R. Croy; P. C. Smethurst, tr.—*American Photographic Publishing Co.*, 173 p., illus., \$2.50. Solutions to many of the problems that harass the advanced amateur and professional photographer are given here, with diagrams showing the methods and photographs illustrating the results obtained.

Science News Letter, February 5, 1938

Philosophy

YOGA EXPLAINED—F. Yeats-Brown—*Viking*, 164 p., \$2. A novelist writes what he has learned in India about a Hindu system of thought and practice, with directions that he believes will enable the reader to use Yoga exercises.

Science News Letter, February 5, 1938

Psychology

THE NEUR-ELECTRO-MAGNETIC THEORY OF NERVE REACTIONS—INCLUDING THINKING—T. A. Bendrat—*Swift*, 156 p., \$3. A technical planographed report presenting the author's own theory.

Science News Letter, February 5, 1938

Psychology

BOREDOM AND OTHER FACTORS IN THE PHYSIOLOGY OF MENTAL EFFORT—Joseph E. Barmack—*Archives of Psychology*, 83 p., \$1.25.

Science News Letter, February 5, 1938

Medicine

MATERNAL DEATHS—THE WAYS TO PREVENTION—Iago Galdston—*Commonwealth Fund*, 115 p., cloth 75 c. paper 50 c. The number of mothers who die in childbirth each year in the United States is a matter of such concern in medical and public health circles that a special conference has been called, under the auspices of the U. S. Children's Bureau, to lay plans for preventing these deaths. Dr. Galdston's book is the outcome of an investigation of the problem undertaken by another organization, the N. Y. Academy of Medicine. Although intended primarily for medical readers, it is non-technical and contains much information of interest to laymen and women.

Science News Letter, February 5, 1938

Herpetology

THE SNAKES OF NEW JERSEY, A GUIDE—Harold Trapido—*Newark Museum*, 60 p., illus., 60 c. A compact, well-illustrated guide to the herpetofauna of a state that within a comparatively limited area offers a rather large range of interesting environmental conditions.

Science News Letter, February 5, 1938

History

HISTORIC CURRENTS IN CHANGING AMERICA—Harry J. Carman, William G. Kimmel and Mabel G. Walker—*Winston*, 854 p., \$2.40.

Science News Letter, February 5, 1938

Exploration

THE STORY OF TWENTIETH-CENTURY EXPLORATION—Charles E. Key—*Knopf*, 320 p., illus., \$3.50. Fascinating tales of a few of the "high spots" of twentieth-century exploration.

Science News Letter, February 5, 1938

Biology

NEW INTRODUCTION TO BIOLOGY (Rev.)—Alfred C. Kinsey—*Lippincott*, 844 p., illus., \$1.76.

Science News Letter, February 5, 1938

Zoology

A COURSE IN VERTEBRATE ZOOLOGY (3d ed.)—Henry S. Pratt—*Ginn*, 362 p., \$2.20.

Science News Letter, February 5, 1938

Child Study

DATA ON THE GROWTH OF PUBLIC SCHOOL CHILDREN—Walter F. Dearborn, John W. M. Rothney and Frank K. Shuttleworth—*Society for Research in Child Development*, 136 p., \$1.

Science News Letter, February 5, 1938